Serial Number: _10/069,799_

ENTERED

CRF Processing Dat : _8/21/2002_
Edited by: _____
Verified by: _____ (STIC staff)

☐ Changed a file from non-ASCII to ASCII

☐ Changed the margins in cases where the sequence text was "wrapped" down to the next line.

☐ Edited a format error in the Current Application Data section, specifically:
_____

☐ Edited the Current Application Data section with the actual current number. The number inputted by the applicant was ☐ the prior application data; or ☐ other _____.

☐ Added the mandatory heading and subheadings for "Current Application Data".

☐ Edited the "Number of Sequences" field. The applicant spelled out a number instead of using an integer.

☐ Changed the spelling of a mandatory field (the headings or subheadings), specifically:
_____

☐ Corrected the SEQ ID NO when obviously incorrect. The sequence numbers that were edited were:
_____

☐ Inserted or corrected a nucleic number at the end of a nucleic line. SEQ ID NO's edited:
_____

☐ Corrected subheading placement. All responses must be on the same line as each subheading. If the applicant placed a response below the subheading, this was moved to its appropriate place.

☐ Inserted colons after headings/subheadings. Headings edited included:
_____

☐ Deleted extra, invalid, headings used by an applicant, specifically:
_____

☑ Deleted: ☑ non-ASCII "garbage" at the beginning/end of files; ☐ secretary initials/filename at end of file; ☐ page numbers throughout text; ☐ other invalid text, such as_____ .

☐ Inserted mandatory headings, specifically: _____

☐ Corrected an obvious error in the response, specifically:
_____

☐ Edited identifiers where upper case is used but lower case is required, or vice versa.

☐ Corrected an error in the Number of Sequences field, specifically:
_____

☐ A "Hard Page Break" code was inserted by the applicant. All occurrences had to be deleted.

☐ Deleted *ending* stop codon in amino acid sequences and adjusted the "(A)Length:" field accordingly (error due to a PatentIn bug). Sequences corrected: _____

☐ Other:
_____
_____
_____
_____

*Examiner: The abov corrections must be communicated to th applicant in th first Offic Action. DO NOT send a copy of this form.

3/1/95

PCT10

RAW SEQUENCE LISTING   DATE: 08/21/2002
PATENT APPLICATION: US/10/069,799   TIME: 20:18:44

        Input Set : A:\PTO.AMC.txt
        Output Set: N:\CRF4\08212002\J069799.raw

 3 <110> APPLICANT: Farn, Jacinta
 4   Strugnell, Richard
 5   Tennent, Jan
 8 <120> TITLE OF INVENTION: Vaccine antigens of Moraxella
10 <130> FILE REFERENCE: 20-02
12 <140> CURRENT APPLICATION NUMBER: US 10/069,799
14 <141> CURRENT FILING DATE: 2002-02-28
16 <150> PRIOR APPLICATION NUMBER: PCT/AU00/01048
18 <151> PRIOR FILING DATE: 2000-08-31·
20 <150> PRIOR APPLICATION NUMBER: AU PQ2571
22 <151> PRIOR FILING DATE: 1999-08-31
24 <160> NUMBER OF SEQ ID NOS: 9
26 <170> SOFTWARE: PatentIn Ver. 2.1
28 <210> SEQ ID NO: 1
29 <211> LENGTH: 1114
30 <212> TYPE: PRT
31 <213> ORGANISM: Moraxella bovis
33 <400> SEQUENCE: 1
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37 Leu Ser Met Ala Cys Met Leu Val Ile Ser Ala Ser Ser Thr Val Ser
38   20   25   30
40 Tyr Ala Asn Ser Ala Pro Met Ile Val Asp Ser Gln Tyr Asn Ser Ser
41   35   40   45
43 Lys Tyr Ser Phe Tyr Asp Tyr Tyr Leu Asp Phe Leu Lys Arg Phe Arg
44   50   55   60
46 Pro Thr Pro Thr Pro Val Pro Ser Pro Val Arg Pro Ala Pro Glu Leu
47 65   70   75   80
49 Val Arg Pro Thr Pro Ala Pro Ile Pro Ala Pro Thr Pro Val Pro Thr
50   85   90   95
52 Pro Ala Pro Ile Ser Gly Gly Ile Ser Gly Ser Tyr Ile Ala Pro Val
53   100   105   110
55 Ser Pro Ser Glu Val Arg Gln Pro Asp Tyr Thr Arg Arg Val Gln Ala
56   115   120   125
58 Asn Leu Lys Arg Asn Gln Pro Ala Pro Ser Ala Gly Thr Arg Thr Gly
59   130   135   140
61 Tyr Ser Val Met Asp Thr Ser Asn Asn Ser Asn Leu Thr Ser Lys Phe
62 145   150   155   160
64 Tyr Gly Thr Thr Glu Asp Gly Tyr Ala Glu Arg Leu Asp Asn Leu Lys
65   165   170   175
67 Asn Thr Ile Asp Thr Arg Gln Ala Lys Val Gly Val Ile Asp Thr Gly
68   180   185   190
70 Ile Asn Arg Phe Asn Arg Asp Leu Val Gly Ala Asn Val His Asp Thr

RAW SEQUENCE LISTING   DATE: 08/21/2002
PATENT APPLICATION: US/10/069,799   TIME: 20:18:45

Input Set : A:\PTO.AMC.txt
Output Set: N:\CRF4\08212002\J069799.raw

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74       210                215                220
76 Asn Asp Ser Gly Ile Val Glu Ile Pro Thr Thr Ser Ala Ser Gly Ser
77 225                230                235                240
79 His Gly Asn Gln Met Ala Ala Val Ile Ala Gly Asn Asn Gly Met Thr
80            245                250                255
82 Asn Ala Lys Ile Tyr Gly Ser Asp Ser Ile Asp Arg Arg Ser Asn Gly
83            260                265                270
85 Gly Asn His Phe Leu Met Met Arg Lys Leu Asn Gln Asp His Gly Val
86            275                280                285
88 Lys Ile Phe Asn Asn Ser Trp Gly Ser Asn Asn Thr Asp Gln Trp Tyr
89       290                295                300
91 Tyr Asp Ala Gln Arg Leu Asn Tyr Asn Pro Thr Thr Gly Gln Ile Asn
92 305                310                315                320
94 Pro Asn Pro Tyr Arg Thr Ser Ile Thr Asn Ala Glu Val Thr Leu Pro
95            325                330                335
97 Val Ile His Asp Leu Ile Met Asn Arg Asp Ser Leu Ile Ile Lys Ala
98            340                345                350
100 Thr Gly Asn Glu Gly Leu Asn Asp Ala His Asp Glu Asn Leu Ala Pro
101          355                360                365
103 Leu Met Asn Ser Asn Phe Lys Lys Gly Phe Ile Thr Val Ser Ser Pro
104       370                375                380
106 Arg Glu Asp Phe Gly Lys Ala Asn His Cys Gly Arg Thr Ala Glu Trp
107 385                390                395                400
109 Cys Val Ser Ala Thr Ser Ser Thr Gln Asn Tyr Ala Asn Asp Gly Arg
110          405                410                415
112 Leu Ser Ser Tyr Lys Gly Thr Ser Pro Ala Thr Ala Arg Val Ser Gly
113          420                425                430
115 Thr Ala Val Leu Val Gln Ser Ala Tyr Pro Trp Met Lys Asn Glu Asn
116          435                440                445
118 Ile Ser Gln Thr Ile Leu Gly Thr Ala Lys Asp Phe Ser Glu Ile Thr
119       450                455                460
121 Ala Asn Ser Pro Asn Gly Tyr Gln Gly Leu Arg Lys Val Ser Arg Leu
122 465                470                475                480
124 Pro Ser Gly Tyr Tyr Gly Ser Tyr Tyr Thr Asp Asn Gln Gly Asn Phe
125          485                490                495
127 Tyr Val Pro Gly Asn Val Asn Trp Glu Asn Arg Arg Ile Val Ala Asn
128          500                505                510
130 His Asn Gly Lys Asn Ile Thr Trp Glu Asp Gly Trp Gly Leu Leu Asp
131          515                520                525
133 Pro Glu Ala Ala Ala Lys Gly Tyr Gly Gly Phe Tyr Trp Asp Asn Val
134       530                535                540
136 Glu Leu Asp Thr Lys Gly Thr Pro Leu Ser Val Phe Tyr Asn Asp Leu
137 545                550                555                560
139 Lys Gly Asp Lys Gly Phe Thr Lys Lys Gly Glu Gly Lys Leu Val Phe
140          565                570                575
142 Thr Gly Asn Asn Ser Tyr Lys Gly Asp Ser Val Ile Glu Gly Gly Ser
143          580                585                590
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RAW SEQUENCE LISTING   DATE: 08/21/2002
PATENT APPLICATION: US/10/069,799   TIME: 20:18:45

Input Set : A:\PTO.AMC.txt
Output Set: N:\CRF4\08212002\J069799.raw

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148 Gly Glu Leu Thr Gly Tyr Gly Asn Val Ala Asn Val Arg Gln Thr Gly
149         610             615             620
151 Gly Trp Val Asn Asn Glu Gly Asn Leu Asn Ile Arg Gly Asp Tyr Asn
152 625             630             635             640
154 Ile Asn Thr Gln Arg Gly Val Asp Ala Gly Leu Lys Ala Gln Phe Gly
155             645             650             655
157 Asn Met Leu Thr Val Asp Gly Lys Ala Lys Leu Gly Gly Thr Leu Asn
158             660             665             670
160 Leu Thr Gly Glu Thr Lys Asp Gly Ile Ile Ser Lys Ser Gly Ser Arg
161         675             680             685
163 Ser Thr Val Leu Arg Ala Lys Arg Gly Leu Glu Gly Gln Phe Asp Asn
164         690             695             700
166 Tyr Arg Ser Ser Asn Pro Leu Phe Glu Val Thr Asn Val Glu Tyr Thr
167 705             710             715             720
169 Pro Glu Val Asp Arg Asn Gly Arg Val Val Gly Gly Ser Arg Thr Asn
170             725             730             735
172 Asn Asp Val Gln Val Thr Ala Lys Arg Leu Ser Ala Gly Asn Val Val
173             740             745             750
175 Tyr Gly Ile Ser Met Asn Asp Ser Gly Ser Arg Val Ala Gln Asn Leu
176         755             760             765
178 Asp Lys Val Leu Asn Asp Leu Asp Lys Lys Gln Glu Thr Gln Gly Ser
179         770             775             780
181 Leu Thr Ser Asp Glu Lys Gln Phe Ala Asn Arg Val Phe Thr Gly Phe
182 785             790             795             800
184 Glu Asn Met Asn Ser Gly Ala Glu Ser Lys Leu Ser Thr Val Ser Thr
185             805             810             815
187 Asn Arg Glu Leu Tyr Lys Leu Asp Pro Thr Phe Tyr Ala Asp Ser Ala
188         820             825             830
190 Leu Asn Ala Val Glu Asp Ser Ala Asn His Ala Thr Glu Phe Gly Lys
191         835             840             845
193 Arg Val Ser Ala Pro Arg Gly Val Trp Gly Asn Ile Ser His His Asp
194         850             855             860
196 Tyr Asp Val Glu Leu Glu His Ala Thr Ser Ala Arg Lys Gly Asn Asn
197 865             870             875             880
199 Ile Ser Val Gly Ala Ser Thr Gln Thr Ala Ala Asp Ile Ser Val Gly
200             885             890             895
202 Ala Gln Leu Asp Val Ser Lys Leu Asp Leu Glu Glu Ser Val Tyr Gly
203         900             905             910
205 Ile Gly Asn Lys Thr Lys Thr Asp Ser Ile Gly Leu Thr Val Gly Ala
206         915             920             925
208 Ser Lys Lys Leu Gly Asp Ala Tyr Leu Ser Gly Trp Val Lys Gly Ala
209         930             935             940
211 Lys Val Asp Thr Glu Ala Asn Arg Gly Glu Asn Ser Asn Lys Val Glu
212 945             950             955             960
214 Tyr Asn Gly Lys Leu Tyr Gly Ala Gly Ile Gln Ala Gly Thr Asn Ile
215             965             970             975
217 Asp Thr Ala Ser Gly Val Ser Val Gln Pro Tyr Ala Phe Val Asn His
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RAW SEQUENCE LISTING   DATE: 08/21/2002
PATENT APPLICATION: US/10/069,799 TIME: 20:18:45

Input Set : A:\PTO.AMC.txt
Output Set: N:\CRF4\08212002\J069799.raw

```
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220 Gln Gln Tyr Lys Asn Asp Gly Ser Phe Asn Asp Gly Leu Asn Val Val
221          995             1000            1005
223 Asp Asp Ile Glu Ala Lys Gln Thr Gln Val Gly Val Gly Ala Asp Met
224    1010            1015            1020
226 Val Phe Gln Ala Thr Pro Ala Leu Gln Leu Thr Gly Gly Val Gln Val
227 1025            1030            1035            1040
229 Ala His Ala Val Ser Arg Asp Thr Asn Leu Asp Thr Arg Tyr Val Gly
230          1045            1050            1055
232 Thr Ala Thr Asp Val Gln Tyr Gly Thr Trp Asp Thr Asp Lys Thr Lys
233          1060            1065            1070
235 Trp Ser Ala Lys Val Gly Ala Asn Tyr Asn Val Thr Pro Asn Ser Gln
236       1075            1080            1085
238 Val Gly Leu Asn Tyr Ser Tyr Thr Gly Ser Gly Asp Ser Asp Ala Ser
239    1090            1095            1100
241 Gln Val Gly Val Ser Phe Thr Ser Lys Phe
242 1105            1110
246 <210> SEQ ID NO: 2
247 <211> LENGTH: 4384
248 <212> TYPE: DNA
249 <213> ORGANISM: Moraxella bovis
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254 caccgtcacc ctggatgctg taggcatagg cttggttatg ccggtactgc cgggcctctt 180
255 gcgggatatc gtccattccg acagcatcgc cagtcactat ggcgtgctgc tagcgctata 240
256 tgcgttgatg caatttctat gcgcaccgt tctcggagca ctgtccgacc gctttggccg 300
257 ccgcccagtc ctgctcgctt cgctacttgg agccactatc gactacgcga tcatggcgac 360
258 cacacccgtc ctgtggatca ataattaatg aacatatata ctctatttaa tatttcttat 420
259 ttattcgtaa tattgccata aaaataatac attatttcta tattaactaa actgttaata 480
260 tttgtaaata ataaacattt gtttatctaa aaaaataaat aatataaatc aagcaattac 540
261 aatcttattt ttgaaaatac aataatactg caattgctta atctagacat taagtttatt 600
262 tttgattaaa attgccaaaa cttgtgtaaa taagtttcac cgaattgata ctttaagggt 660
263 atcaatattg caacatggta aatgattgct atgttgttgg gcattgcata aattgtctat 720
264 aataacttgt tatggatgat tgatggcaat gataaactta gtgacaatga taaacgcaaa 780
265 gaggtgtaat atgtcattac aaactcaacc tgccaagaga gggttctatg ttaagccttt 840
266 aagtatggct tgcatgctgg taattagtgc tagtagtacg gtaagttatg ccaactcagc 900
267 tccaatgatt gttgattcac agtacaatag ttctaaatac tctttctacg attactattt 960
268 agatttcctt aaacgtttta gaccaactcc aactccagtg ccaagccctg tgagaccggc 1020
269 tcctgaactc gttcgtccga ccccagcccc gattccggct ccaacgcctg tgccaacacc 1080
270 ggcaccaatt agtggcggta tatcaggtag ctatattgct ccagtatcgc catcagaggt 1140
271 gagacagcct gattacacaa gacgcgttca agccaatcta aaacgcaacc aacctgcacc 1200
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276 ttccacctgc tatacgccag aaaatgattc aggcattgtt gaaatcccaa caacctctgc 1500
277 tagtggtagt catggcaacc aaatggcggc tgtcatcgct ggtaacaacg gcatgaccaa 1560
278 cgccaaaatt tacggcagtg acagtattga tcgacgttca aatggtggca accatttctt 1620
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              RAW SEQUENCE LISTING              DATE: 08/21/2002
              PATENT APPLICATION:  US/10/069,799    TIME: 20:18:45

              Input Set : A:\PTO.AMC.txt
              Output Set: N:\CRF4\08212002\J069799.raw

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280 taacaacact gaccaatggt actacgatgc tcagcgccta aattacaatc ctactacagg 1740
281 acagattaat ccaaatcctt acagaaccag tattaccaat gctgaagtga ctttgcctgt 1800
282 cattcatgat cttattatga atcgtgactc gcttatcatt aaagcaacag gtaacgaagg 1860
283 cttgaacgat gctcatgatg aaaacctagc accgctcatg aacagcaact tcaaaaaagg 1920
284 tttcattact gtctcctcgc ctagagaaga ttttggtaaa gcgaatcatt gtggtcgaac 1980
285 tgccgaatgg tgtgtatccg caacatcatc tacccaaaat tacgccaacg atggcagact 2040
286 gagtagctat aagggtacat cacctgcaac cgctcgtgtg tccggcacgg cagtgctcgt 2100
287 gcaatctgct tatccttgga tgaaaaatga aaatatctct caaaccattt tgggtactgc 2160
288 caaggatttc tcagagatta ctgccaattc acctaatggc taccaaggac taagaaaggt 2220
289 tagtagattg ccatctggtt attacggctc ttattacact gacaatcagg gtaatttcta 2280
290 tgttcctggc aatgtcaatt gggaaaaccg tcgaattgtc gctaatcata acggcaagaa 2340
291 cattacatgg gaagatggtt ggggtttgtt agatccagaa gcggccgcta aaggttatgg 2400
292 tggtttctat tgggataatg tggaattaga cactaaaggc acgcctttat ctgtattcta 2460
293 caatgaccta aaaggtgata aaggctttac caaaaaaggt gaaggtaaac ttgtctttac 2520
294 tggtaataat agctataaag gcgactctgt catcgagggt ggttcactag aagtaaatgg 2580
295 taacaacggt ggttcaacca tggttgttaa aggtggtgaa ctaacaggtt atggtaatgt 2640
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303 gaatgacagt ggtagccgtg ttgcacaaaa cctagacaaa gtacttaatg atttagataa 3120
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305 cactggtttt gaaaacatga attctggtgc agaatctaaa ctttctacag taagcaccaa 3240
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307 agacagtgct aaccatgcaa ccgaatttgg taagcgtgtt agcgccccaa gaggtgtttg 3360
308 gggtaatatc agtcaccatg attatgatgt agaactagag catgctacaa gtgcacgtaa 3420
309 aggcaacaac attagtgttg gtgcaagcac tcaaactgca gccgacatta gtgttggtgc 3480
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311 caaaactgac agcattggct tgactgttgg tgcttctaag aagttgggtg atgcctatct 3600
312 atcaggttgg gtaaaaggtg ccaaagttga tacagaagcg aaccgtggtg aaaactctaa 3660
313 caaagttgag tacaatggta agctatatgg tgctggtatc caagcgggta caaacattga 3720
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316 ggtaggtgtg ggtgctgata tggtgttcca agcaacacct gctctacagc ttactggtgg 3900
317 tgtgcaagtt gctcacgctg ttagccgtga caccaaccta gacactcgct atgttggtac 3960
318 agcgacagat gtacagtatg gcacttggga tactgacaaa accaaatggt cagccaaggt 4020
319 tggtgctaac tataatgtga caccaaacag ccaagtgggt ctaaactaca gctacacagg 4080
320 tagtggcgat tcagatgctt cccaagtggg tgtgagcttc accagcaagt tctaattcat 4140
321 taataaggca acaaaaaaca gcacaatttc ggttgtgctg ttttttgtga tgccgagcgt 4200
322 aaaattttcc caaaaaaagc gtgataatta ccacgctttt ttattgcata ttgcaaaata 4260
323 gtattgcatt tatgggttgt taagcaaccc gtccaaatac cccctaaaca actccacccc 4320
324 aatcggtgct aacttgtttt gccacaggct cgtcaatgtg tcggcatcat caaccattac 4380
325 cgac                                                              4384
328 <210> SEQ ID NO: 3
329 <211> LENGTH: 616
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RAW SEQUENCE LISTING ERROR SUMMARY   DATE: 08/21/2002
PATENT APPLICATION: US/10/069,799   TIME: 20:18:46

Input Set : A:\PTO.AMC.txt
Output Set: N:\CRF4\08212002\J069799.raw

<u>Please Note:</u>
Use of n and/or Xaa have been detected in the Sequence Listing. Please review the
Sequence Listing to ensure that a corresponding explanation is presented in the <220>
to <223> fields of each sequence which presents at least one n or Xaa.

Seq#:7; Xaa Pos. 14,16